WHAT IS CLAIMED IS:

1. A structuring element A for detecting and removing speckles from a scanned image comprising an annular window shape comprising two squares of different sizes sharing the same geometric center point, wherein the pixel to be evaluated is at the center point of the structuring element A.

2. The structuring element according to claim 1, wherein an inner square of the structuring element A has a side dimension N, and an outer square has a side dimension M, wherein N represents a largest speckle that can be removed and M represents a distance the speckle lies from other objects.

3. The structuring element according to claim 2, wherein M is at least equal to N+2.

4. The structuring element according to claim 1, wherein a domain of the structuring element A, D[A], is a region between the two squares sharing the same center.

5. The structuring element according to claim 4, wherein the domain of the structuring element A has a constant value of zero over the entire domain.

6. A method for removing speckles using an algorithm comprising

(a) eroding a grayscale image if the background is light or dilating the grayscale image if the background is dark with the structuring element A according to claim 1;

(b) detecting potential speckles by examining each eroded pixel within the structuring element by a pixel value and a pixel location relative to other pixels;

(c) evaluating whether a detected potential speckle is an actual speckle; and

(d) removing pixels determined to be actual speckles.

7. The method according to claim 6, wherein eroding the grayscale image with the structuring element A comprises finding a darkest pixel value if the background is light, and finding the lightest pixel value if the background is dark in a domain of structuring element A.

8. The method according to claim 7, wherein a pixel in the center of the structuring element A is replaced if the darkest pixel value in the domain of structuring element A is lighter than an original color of the pixel in the center if the background is light.

9. The method according to claim 7, wherein a pixel in the center of the structuring element A is replaced if the lightest pixel value in the domain of structuring element A is darker than an original color of the pixel in the center if the background is dark.

10. The method according to claim 7, wherein a pixel in the center of the structuring element A is not replaced if the darkest pixel value in the domain of structuring element A is darker than an original color of the pixel in the center where the background is light.

11. The method according to claim 7, wherein a pixel in the center of the structuring element A is not replaced if the lightest pixel value in the domain of structuring element A is lighter than an original color of the pixel in the center where the background is dark.

12. The method according to claim 6, further comprising applying a series of grayscale openings to connect halftone dots together prior to detecting and removing speckles with a structuring element A.

13. The method according to claim 12, wherein the series of grayscale openings comprise one- or two-dimensional structuring elements η.

14. The method according to claim 13, wherein the structuring elements η comprise a line of K pixels in a x-axis, a line of K pixels in a y-axis, a line of pixels lying in at a forty-five degree angle relative to the x-axis wherein the line of pixels is K pixels long in the x-axis, and two lines of pixels running perpendicular to each other and intersecting at their midpoints wherein a distance between two adjacent corners is K, wherein K is a predetermined value.

15. The method according to claim 12, further comprising a thinning-step after the detection of speckles wherein each connected component in the image is detected and replaced with a single black pixel if the background is white.

16. The method according to claim 12, wherein a mean color of the domain of the structuring element A is calculated and replaces all the pixels in the inner square of the structuring element if a speckle is detected by the structuring element A.

17. The method according to claim 6, wherein a color image is first split into independent monochromatic images representing each color before the color image is eroded.

18. The method according to claim 17, wherein the detected speckles of each color are combined and a uniform background test is performed to remove only those speckles with a uniform background.

19. The method according to claim 18, wherein the detected speckles are replaced by a calculated mean color of D[*A*].

20. The method according to claim 6, wherein the detected potential speckle is an actual speckle where

$$f_{i,j} - B_x < \Gamma$$

wherein $f_{i,j}$ is an actual pixel value at pixel x, B_x is the estimate of the minimum value of $D[A_x]$, and Γ is a pre-determined threshold.

21. The method according to claim 20, wherein B_x is calculated as

$$B_x = \mu + \frac{\alpha - \sqrt{\alpha^2 + 4}}{2}\sigma$$

wherein μ is mean, σ is standard deviation, and α is skewness.

22. The method according to claim 20, wherein there are only two levels of gray, *B* and *W*.

23. The method according to claim 20, wherein Γ is a constant predetermined threshold.

24. The method according to claim 20, wherein all the pixels inside an inner square of the structuring element *A* are replaced by a mean color of the domain of the structuring element *A*, D[*A*], a region between the two squares sharing the same center, if a speckle is declared.

25. The method according to claim 20, wherein there is only one pass of the image through a video.

26. The method according to claim 6, wherein all the speckles in a region between the two squares sharing the same section of structuring element *A*, D[*A*], are classified into two sets, B_x and W_x, where B_x contains all the pixels with a gray level less than 128, and W_x contains all the pixels greater than or equal to 128, and a mean and a variance of each set is calculated.

27. The method according to claim 26, wherein if the B_x set is not empty, the minimum of D[*A*] is approximated as the maximum of 0 and the mean of B_x minus 3 times the standard deviation of B_x.

28. The method according to claim 26, wherein if the B_x set is empty, the minimum of D[*A*] is approximated to be the maximum of 0 and the mean of W_x minus 3 times the standard deviation of W_x.

29. The method according to claim 26, wherein an examined pixel is declared an actual speckle where the examined pixel is less than the estimated $D[A]$ by a predetermined threshold, and is removed by replacing all pixels inside the inner square of the structuring element A by a mean color of the domain of the structuring element A, $D[A]$.

30. The method according to claim 6, wherein the image is quantized to fewer than 8 bits of data.

31. The method according to claim 30, wherein the image is quantized to 3 bits of data.

32. The method according to claim 30, wherein an eight-bin histogram is computed for each column in an annular window of structuring element A, and an eight-bin histogram is computed for an entire annular window.

33. The method according to claim 32, wherein a window histogram is the sum of the 8 column histograms.

34. The method according to claim 33, wherein as the window moves right to scan an image, a left most column histogram of the window is subtracted as a new histogram is computed for an incoming column histogram on the right.

35. The method according to claim 34, wherein the incoming histogram is saved and added to the window histogram, and the minimum of the grayscale image is obtained from the window histogram.